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Case Study

ROLE OF *JALAUKA AVACHARAN* (LEECH THERAPY) IN THE MANAGEMENT OF NON-HEALING ULCER: A CASE STUDY

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ABSTRACT
Non-healing ulcers are a serious health issue that affects people all over the world. They are expensive in terms of both human and material resources. Unavoidable and harmful to the lower limb, non-healing ulcers are a leading factor in non-traumatic lower limb amputations. Numerous studies have examined the potential effects of medicinal leech therapy (MLT), also known as hirudotherapy or *Jalaukavcharan* in Ayurveda on a variety of illnesses, including Skin disorders and inflammatory diseases, as well as various surgical ailments. Despite the lengthy history of complementary health practises, contemporary medicine has only recently focused on their potential mechanisms of action. Many bioactive compounds, including antistasin, eglins, guamerin, hirudin, saratin, and bdellins, as well as complement and carboxypeptidase inhibitors, are secreted by leeches. In addition to extracellular matrix degradative and antibacterial actions, they exhibit analgesic, anti-inflammatory, platelet inhibitory, anticoagulant, and thrombin regulating properties. However, with more research, the range of effects may broaden. The method has been shown to be affordable, efficient, simple to use, and effective. The aim of this study to evaluate the effectiveness of *Jalaukavcharan* to promote the healing processes in non-healing ulcer. The study was an observational single case design without control group; it was carried out in department of Shalya of Rajiv Gandhi Post Graduate Ayurvedic College, Paprola.

INTRODUCTION
The term "chronic ulcers," also known as "non-healing ulcers," refers to spontaneous or traumatic lesions, usually in the lower extremities, that are unresponsive to initial therapy or that persist despite appropriate care and do not progress towards healing in a defined time period with an underlying aetiology that may be related to systemic disease or local disorders [1-2]. Non-healing ulcers come in a variety of forms, such as venous, arterial, diabetic, pressure, and traumatic ulcers. Inflammation, tissue creation, and tissue remodelling are the three steps of the typical wound healing process.

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The absence of growth factors and cytokines, which slow down the healing process, might cause an ulcer to become chronic in nature if the usual healing process is interrupted [3]. Numerous chronic ulcers return after healing or remain for months or years despite therapy, necessitating more sophisticated wound care therapies[3]. Chronic wounds that don't tend to heal after 3 months of the proper care, or that are still not totally healed at 12 months, are referred to as non-healing ulcers [2]. Adults who have chronic ulceration of the lower legs typically have growing discomfort, friable granulation tissue, an unpleasant odour, and wound collapse rather than healing[3]. According to reports, venous insufficiency-related ulcers account for 70%, arterial disease for 10%, and mixed-aetiology ulcers for 15% of leg ulcer presentations[4]. We seem to have a mixed variety of ulcer as the patient had H/O Diabetes and PAD. Reduced arterial blood flow and consequent tissue perfusion cause arterial leg ulcers [5]. The tissue being supplied by the impacted artery dies when the blood

flow is reduced. Reduced arterial blood flow and consequent tissue perfusion cause arterial leg ulcers[5]. The development of ulcers is frequently accelerated by extensive tissue damage. The toes, heels, and bony prominences of the foot are the most common locations for arterial ulceration. The ulcer has well-defined borders that give it the appearance of having been "punched out," as well as a pale, necrotic foundation.

AIM AND OBJECTIVE

To evaluate clinical efficacy of 'Leech Therapy' in the patient with non-healing ulcer.

Clinical Technique: Leech Therapy (*Jalaukavcharana)*

Type of Study: Observational and Interventional Single Case Design without control group

Study Centre: Department of *Shalya* of Rajiv Gandhi Post Graduate Ayurvedic College Paprola.

MATERIAL AND METHODS

Present study was carried out in OPD 103 in the Department of Shalya of Rajiv Gandhi Post Graduate Ayurvedic College Paprola. The patient was diagnosed by the consultant as a case of non-healing ulcer in a patient of K/C/O Type 2 DM associated with Peripheral arterial disease. Patient was informed and written consent taken. Before start the study a profile of haemogram, biochemical and serological test were performed to rule out the clotting and bleeding time, blood glucose levels, anaemia, HIV, HBsAG etc. Leeches were obtained from scientific supplier of Agra, to apply on non-healing wound. They were kept in separate glass jars of water (labelling with used leeches and unused leeches and name of the patient used upon) on ulcer during the study. Weekly one or two leeches were used (same leech on same individual unless the leech died, then it would be replaced by a new fresh leech). Initially the leech therapy preceded with cautious debridement to minimise tissue loss and maximise wound hygiene. When they would become sufficiently healed then the leech therapy was replaced by wound dressing with *Madhu* (honey). Total treatment lasted for about six months.

Case Brief History

The patient for case study was a 68yrs old Retired Ayurvedic Physician who was known case of Type 2 DM since 2001. He took no medicines in the initial phase but rather took some local traditional herbal preparations on/off. As the glucose levels fluctuated, he was put on oral hypoglycaemics. When inquired regarding the ulcer he told that one day he went to a bay for a walk where he got hit with a stone which he later forgot about. It was followed with swelling on dorsum of foot which he ignored thinking that it would probably be due to hyperuricemia. Soon he realised that due to repetitive trauma i.e., wearing sandals, there was some blackish painful discoloration on dorsum on left foot, which sloughed off turning to an unhealthy wound. He came to us in December when the ulcer was examined along with the debridement of the wound. Bed rest was advised with a course of anti-biotics. He was advised arterial colour Doppler (table -1). On examination the ulcer was smooth edged, well defined, punched margins with severe pain. When palpated popliteal artery was palpable but the dorsalis pedis and posterior tibial pulse were absent on B/L feet. The skin of surrounding area was thin, shiny along with other signs of vascular insufficiency. Swelling subsided after a few days but patient was called for follow up daily for ASD due to consistent slough and discharge. When the would be status somewhat improved he was advised for MLT (medicinal leech therapy) once a week by the end of December and continued up to May. Also the patient was put on medications for PAD and altered lipid Profile. The ulcer size slowly but steadily reduced and when it was healthy enough the MLT was replaced by ASD with honey (*Madhu*). The ulcer healed by the month of July and mild scarring was left. Allopathic medications for diabetes, dyslipidaemia and peripheral arterial disease were continued as adjuvants to the Ayurvedic treatment modality.

Arterial Doppler – Bilateral lower limb (table -1), CT Angiography B/L Limb arteries (Plain and contrast) before (table -2) and after treatment (table -3).

Table -1: Arterial Doppler – Bilateral lower limb {Dated 19-12-2020}
➢ Extensive generalised atherosclerotic changes. ➢ Occluded bilateral superficial femoral arteries with reconstitution of blood flow in popliteal artery on both sides via collateral vessels.

Table -2: CT Angiography B/L Limb arteries (Plain and contrast) Before Treatment
➢ Significant atherosclerosis changes seen to start from aorta and its branches of Grade 4 nature causing nearly 10% of luminal narrowing. ➢ Significant atherosclerotic changes seen in bilateral common femoral, superficial femoral and profunda femoris. Near total occlusion of bilateral SFA is seen nearly 80-90% to luminal narrowing. ➢ 70-80% luminal reduction of right popliteal artery, 60-70% in left popliteal artery where

circumferential atherosclerotic plaques seen. B/L Tibial peroneal trunk, peroneal artery, anterior tibial, posterior tibial and dorsalis pedis arteries critical grade 4 plaques.

- **Impression**– Significant atherosclerotic disease (likely smoking related) involving b/l lower limb with multiple collateral vessel formation– significant PAD (adv: surgical intervention needed)

Table -3: CT Angiography B/L Limb arteries (Plain and contrast)) After Treatment

- Atherosclerosis changes are seen in descending aorta and involving b/l common iliac arteries with nearly 15-20% occlusive changes to b/l common iliac arteries.
- Nearly 20-25% occlusive changes are seen to b/l external iliac, critical narrowing changes in b/l SFA, profunda femoris, and involving b/l popliteal and tibioperoneal trunks.
- Near occlusion of ATA on either side however due to collateralisation, faint opacification seen in b/l PTA and DPA.
- **Impression**– Significant atherosclerotic disease b/l lower limb vessels with significant circumferential plaques starting from SFA on either sides with multiple collateral vessel formation with near total occlusion (non-opacification) of distal ATA b/l- Significant PAD – chronic in nature.

Figure 1: Before treatment

Figure 2: During treatment

Figure 3 During Treatment

Figure 4 After Treatment

Local Examination of the wound

Non-healing static ulcer on dorsal aspect on left foot of 3 months duration. The wound bed was partially sloughy and seemed non progressive. There was inflammation of the surrounding tissue and the ulcers was deep. On local examination the ulcerated area covered was 4cm x3.5cm x 0.3cm (Figure-1). Shape was oval, edges were dry, slough was present and floor was unhealthy and less granulation tissues are present. Discharge was heavy often mixed with pus and foul smell. While on grading, it was Wagner Grade 2 type (ulcer deeper to subcutaneous tissue extension into tendons, bones, or joint capsule which may be exposed). On Palpation of ulcer the edge, margin and base were tender. The local temperature was normal but the surrounding tissue was inflamed and generalised swelling was present.

OBSERVATIONS

Month	Procedure	Observation
December	Initial 15 days of debridement of the slough. Unhealthy tissue excised, margins cleaned. Rest to the part. By the end of December medicinal leech therapy (MLT) started twice a week. **Figure – 1**	Wound status - Unhealthy Margins- Punched out Floor- Callus and slough present (Wagner grade 2) Moderate necrotic tissue present. Exudate- Heavy (dressing soaked) Granulation tissue - None Inflammation and swelling- Present
January	ASD Daily. MLT twice a week. **Figure – 2**	Wound status- Improving Margins- Punched out Floor- Slough mild present Exudate- Medium (dressing wet) Inflammation and swelling - Subsided
Febuary	ASD Alternate day MLT once a week.	Wound status – Improving Margins - Slanting Floor - Minimum slough present Exudate –Medium (wet dressing)
March	ASD alternate day MLT Once a week **Figure – 3**	Wound status – Improving Healthy granulation tissue present. Exudate – Medium
April	ASD alternate day MLT once a week	Wound status – Healthy Granulation tissue present. Exudate – Minimum (dry dressing)
May	ASD twice a week with local application of *Madhu* (honey)	Wound status – Healthy Healthy granulation. Minimum exudate.
June	ASD twice a week with local application of *Madhu* (honey)	Epithelisation visible. No exudation.

DISCUSSION

Acharya Sushruta accepted *Raktamokshana* as a part of *Panchakarma* because of its significance in numerous diseases. In *Sushruta Samhita*, the procedure of *Raktamokshana* has been hailed as one of the most effective therapies of *Vranashopha*[6-7] and most delicate method of bloodletting *(Raktamokshan)* is *Jalaukavcharan*. The importance of *Jalaukavcharan* can be assessed by the fact that the lord *Dhanvantri* (the God of Ayurveda) was carrying leeches at the time of his origin in the course of *Ksheerasagaramantha* (churning of ocean of milk)[8]. According to Ayurvedic texts, the probable method of action of *Jalaukavcharan* was owing to its ability to remove vitiated *Doshas*. Although there are three *Sharira Doshas, Rakta* is sometimes called the fourth *Dosha* since the *Rakta Dhatu* is the primary transporter of vitiated *Pitta* throughout the body. This shows that the vitiated *Pitta Dhatu* is carrying metabolic waste along with the circulatory fluid. When this *Rakta Dhatu* is removed from the body, it carries the vitiated *Pitta* with it, cleaning the body and further diminishing its quantum through compensatory generation of healthy *Rakta Dhatu* produced by blood loss [9]. The leech produces a variety of molecules that contribute to the bite's unique properties, including anticoagulants such as hirudin, calin, kallikrein and hayaluronidase inhibitors, histamine-like vasodilators, collagenase, and poorly described anaesthetic and analgesic compounds [10-11]. Furthermore, some of these substances have anti-inflammatory and other additional effects like lipotropic activity that can be used at atherosclerotic defects of vessels [12]. These properties of leech's saliva help in to reducing pain and size of ulcer and promote healing[13]. Present study evaluated that ulcer displayed great clinical evolution, resulting in complete healing in six months. Initially, the wound was elliptical with irregular margins, and the floor was unhealthy. The ulcer was filled with a foul-smelling severe exudates mixed with pus (Figure-1). After two weeks, the wound bed had reduced ulcer size, the edges were uneven, and the floor was unhealthy, little granulation tissue visible at the wound margins. It was also noticeable that the wound had reduced in size and discharge with no unpleasant odour by the end of third month (Figure-3). The ulcer demonstrated an apparent healing process by fourth month, culminating in a smaller ulcer with regular edges and a smooth and granulated floor without discharge. Finally, a non-

healing ulcer was properly healed by the end of six months (Figure- 4). Also considerable changes were seen in the atherosclerotic status of the vessels as well as development of collaterals that might have been a contributing factor in the healing of ulcer.

CONCLUSION

We were prompted to perform this investigation due to the reported favourable effect of *Jalaukavcharan* in the treatment of non-healing ulcers. The current study shows that leech therapy on non-healing ulcers reduces ulcer size and shape while removing slough, and stimulates granulation, epithelization of the wound, which aids in wound healing completely. When we compared the ulcer before and after leech therapy in our study, we could see favourable results as the wound healed fully in six months. It is hard to judge if the ulcer healed due to the effect of leech or natural course of action but one can clearly see difference in the atherosclerotic status of patient and development of collaterals but that might also be due to the adjuvant medications for the pre-existing comorbidities (also no evidence to prove this).

Considering the above mentioned case one can't conclude if the results were as expected or not as the time taken for complete healing was longer than expected.

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